

**BY ORDER OF THE  
SECRETARY OF THE AIR FORCE**

**AIR FORCE INSTRUCTION 11-2C-130J  
VOLUME 3 Addenda B**



**8 OCTOBER 2014**

***Flying Operations***

***C-130J MODULAR AIRBORNE FIRE  
FIGHTING SYSTEM (MAFFS)  
PROCEDURES***

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This addenda supports AFI 11-2C-130J Vol 3, *C-130 Operations Procedures*; and implements AFD 11-2, *Aircrew Operations*, AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, and AFI 11-202 Vol 3, *General Flight Rules*. It establishes policy for the MAFFS units to safely and successfully accomplish the worldwide MAFFS missions. Permission to deviate and waivers may be requested in accordance with paragraph 1.3 of this addendum. This instruction applies to Air National Guard (ANG) and Air Force Reserve (AFRC) Units. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information System (AFRIMS) at <https://www.my.af.mil/afrims/afrims/afrims/rims.cfm>. This publication requires the collection and or maintenance of information protected by the Privacy Act (PA) of 1974. The authorities to collect and or maintain the records prescribed in this publication are Title 10 *United States Code*, Chapter 857 and *E.O. 9397 (SSN)* as amended by Executive Order 13478, Amendments to Executive Order 9397 Relating to Federal Agency Use of Social Security Numbers, November 18, 2008. Forms affected by the PA have an appropriate PA statement. System of records notice F011 AF XO, *Aviation Resource Management System (ARMS)* applies. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

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## Chapter 1

### POLICY

**1.1. Sound Judgment.** These procedures provide guidance to plan and execute Modular Airborne Fire Fighting System (MAFFS) missions. Instructions in this AFI are mandatory and intended to provide the best possible operating procedures across a wide range of circumstances, but cannot account for every possible situation a crewmember may encounter during a MAFFS mission. Planners and aircrew must use sound judgment and operational risk management to manage unique mission demands.

**1.2. General.** MAFFS consists of a palletized pressurized tank system and dispensing nozzle loaded on C-130J aircraft modified by TCTO 1C-130J-866, Installation of MAFFS II electrical panel. When mobilized, MAFFS equipped aircraft will be employed in support of the National Interagency Fire Center (NIFC) or a respective State agency responsible for firefighting (e.g. CalFire) to control forest/wildland fires.

1.2.1. The term “MAFFS” is used as a generic term which includes all operations relating to the deployment, employment and redeployment of the MAFFS system for the purposes of aerial delivery of liquid (retardant, water, or other approved liquid) from a suitably equipped C-130J aircraft in support of wildland fires.

1.2.2. Guidance for MAFFS missions includes but is not limited to: United States Forest Service (USFS) MAFFS Operating Plan (FSI 12-001), 1AF and 18AF OPORDs, and this instruction.

**1.3. Deviations and Waivers.** Do not deviate from policies in this AFI except when the situation demands immediate action to ensure safety. The Pilot in Command (PIC) is vested with ultimate mission authority and responsible for each course of action they choose to take.

1.3.1. Deviations. The PIC shall report deviations or exceptions taken without a waiver through command channels to their Chief, Major Command (MAJCOM) Stan/Eval.

1.3.2. Waivers. Unless otherwise directed, and IAW AFI 11-202V3, waiver authority for the content of this instruction is MAJCOM/A3 with mission execution authority. For USTRANSCOM/AMC operational missions under Operational Control (OPCON) of 18 Air Force, 18 AF/CC is the waiver authority. For aircrews that Change Operational Control (CHOP) to a CCMD the COMAFFOR is the waiver authority.

1.3.2.1. Federal MAFFS activations that fall under USNORTHCOM are executed through the 1st AETF (ACC). 1AF/CC, as the COMAFFOR, is the waiver authority for USNORTHCOM missions.

1.3.2.2. Waivers for state missions will be routed through State JFHQ to NGB/A3.

**1.4. Improvement Recommendations.** Send comments and suggested improvements to this instruction on an AF Form 847, *Recommendation for Change of Publication*, through channels to HQ AMC/A3V, 402 Scott Drive Unit 3A1, Scott AFB IL, 62225-5302 or post to the Air Mobility Command Change of Publication sharepoint site: <https://cs.eis.af.mil/aircrewpubs/AMC%20847%20Program/default.aspx>.

## Chapter 2

### COMMAND AND CONTROL

**2.1. Air Expeditionary Group-Wildland Firefighting (AEG-WFF).** CDRAFNORTH, in coordination with ACC, will stand up the AEG-WFF and appropriate provisional EAS(P) under the 1 Air Expeditionary Task Force (AETF), to provide C2 for aviation units employed during WFF operations.

2.1.1. The designated AEG-WFF/CC will coordinate all logistical issues on behalf of the remaining three units for deployment and employment using reachback to their home unit if required for logistics support.

2.1.2. The AEG-WFF/CC is charged with the responsibility of achieving unity of effort through the employment of forces from both the Active and Reserve Components to support civil authorities in the endeavor of wildland firefighting. The AEG-WFF/CC exercises command authority over all assigned military personnel in Title 10 and Title 5 status, and coordinating authority over all personnel participating in Title 32 and State Active Duty (SAD) status. Command Authority is delegated to the AEG-WFF/CC through written order. Coordinating Authority is provided by written agreement between the DoD and the Several States. For State government activations of National Guard personnel, the respective OG/CC is charged with command authority over assigned Title 32 and SAD personnel.

### **2.2. Provisional Expeditionary Aerospace Squadron-Mission Commander.**

2.2.1. An EAS-WFF (P)/MC will be selected for all MAFFS activations and will report to the AEG-WFF/CC (Federal Activations) or to the appropriate OG/CC (State Activations). This Mission Commander will be a MAFFS qualified rated officer no lower than the rank of Major/O-4.

2.2.2. The military unit responsible to provide the EAS (P)-WFF/MC will be identified in the initial MAFFS activation message. The naming convention of each EAS should follow that of the MAFFS flying squadron responsible for providing the bulk of equipment and personnel to the deployed location, unless that name is already in use at another EAS location. **Example:** If the 731st AS has been tasked to stand up an EAS, the name would be 731 EAS. The AEG-WFF/CC has the final say on what name an EAS (P) will use.

2.2.3. The EAS(P)-WFF/MC is the primary point of contact between the military and the MAFFS Liaison Officer (MLO) and is the single point of contact for all military activities, equipment, and personnel (including air technicians assigned to MAFFS duties) at the deployed location.

2.2.4. The MLO (federal or state) is single point of contact for all other (non-military) agencies.

2.2.5. The EAS (P)-WFF/MC should not act as a primary crew member on MAFFS airdrop missions. This does not preclude the EAS (P)-WFF/MC from accomplishing annual refresher training. The EAS (P)/MC or AEG-WFF/CC will not be assigned to a MAFFS hard crew, but may be utilized during periods of reduced manning or to substitute crewmembers for short durations. An acting mission commander will be declared any time the primary EAS(P)-WFF/MC is not available for duty (such as flying), and the MLO and AEG-WFF/CC

will be notified. Reference [paragraph 4.2](#) for EAS (P)/MC or AEG-WFF personnel crew rest requirements.

2.2.6. The EAS (P)/MC will maintain awareness of the national and regional fire situation and ensure MAFFS aircrew are informed of any changes that could adversely impact the mission, as soon as practical. Specifically, the MC should be aware of the status and location of local / regional incidents, weather systems, NOTAMS, Temporary Flight Restrictions (TFR), etc. at all times.

### **2.3. International Support.**

2.3.1. Every effort will be made to conduct International Support with a Leadplane pilot and Lead Aircraft. MAFFS deployment outside of NORTHCOM AOR will normally remain under OPCON of 18 AF. The typical standing DSCA order does not apply outside of CONUS. Detailed planning with the host nation, MAFFS wings, AEG-WFF/CC, NIFC and other stakeholders will be facilitated by 18 AF and appropriate orders issued prior to movement.

2.3.2. International assignments may be accepted after a risk assessment has been completed and made available for review by the Assistant Director of Operations, Fire and Aviation Manager. Ideally, personnel requested will deploy with the aircraft tasked to support the International Assignment. The MAFFS Liaison Officer, (MLO), MAFFS Air Base Manager (MABM), MAFFS Leadplane Pilot (one per MAFFS aircraft), and EAS (P)-WFF/MC positions will be filled for international MAFFS assignments. At least one Field Support Representative (FSR) will be requested. A minimum of two FSR's is recommended. Requesting US Embassy will provide a representative and interpreter, if necessary, to assist the MLO and EAS (P)-WFF/MC.

2.3.3. When unable to fly the lead plane aircraft to the international location, international MAFFS missions will utilize a qualified MAFFS Leadplane pilot on board the MAFFS aircraft to assist the Aircraft Commander with firefighting analysis and requirements. Leadplane pilots are authorized MEP status during both training and employment missions IAW AFI 11-401, *Aviation Management*.

2.3.4. Employment missions outside the NORTHCOM AOR require a MAFFS Instructor Pilot as the aircraft commander.

### **2.4. Flight Authorizations.**

2.4.1. Wings will generate FAs for each crew they deploy in support of MAFFS. Intent is for deploying crews to operate as a contiguous crew utilizing the same FA.

## Chapter 3

### DEPLOYMENT/REDEPLOYMENT

**3.1. Deployment.** The USFS term for “deployment” is “mobilization”. Deploy one MAFFS qualified crew per tasked MAFFS aircraft. If anticipated operational tempo dictates, additional crewmembers may be deployed at the direction of the AEG-WFF/CC with the concurrence of the MAFFS Liaison Officer (MLO). This additional crewmember must be added to the appropriate TPFDD with info e- mails sent to AFNORTH A3X and AMC A3O if not identified in the original employment message. Deploy USFS required support equipment using the most rapid means commensurate within the timeline specified by the requesting organization. Airlift Wings deploying in support of MAFFS should source airlift organically. Deployment / redeployment of support equipment and personnel should be accomplished using the most cost effective, efficient means available. Support from one of the other MAFFS Airlift Wings may also be used. MAFFS ground compressors (if required) should be transported by airlift or suitably cushioned ground transportation to reduce potential damage. Retardant mixing facilities (pit pallet), MLO support equipment, MAFFS unit maintenance equipment and MAFFS mechanics (as permitted by AFI 11-401) may also be transported via airlift. Airlift requests will be made through the AEG-WFF/CC to source appropriately (ANG, AFRC, or 618 AOC (TACC)) if MAFFS wing organic airlift is unavailable.

3.1.1. System Functional Check. MAFFS should be functionally checked on the ground with a 1000 gallon water minimum discharge each time the system is installed on an aircraft prior to loading with retardant. This check should occur at home station prior to departure when practical.

3.1.2. If operations are anticipated to be conducted for more than two weeks, request deployment of one MAFFS trailer per employment location. MAFFS trailers are not equipped or approved for towing over civilian roads or highways. The MAFFS trailer may be transported by C-130 or via commercial flatbed semi-trailer. The EAS (P)/MC will coordinate with the MLO for the desired transportation method.

3.1.3. MAFFS units and some equipment used in support of the MAFFS mission are owned and maintained by the USFS. Deployment of the MAFFS units also includes deployment of the associated ground support equipment required to execute firefighting operations.

3.1.4. MAFFS Tool Accountability and Positioning. MAFFS tool boxes will use the Consolidated Tool Kit (CTK) program IAW AFI 21-101 AMC Sup, *Aircraft and Equipment Maintenance Management*, Ch 10 Tools and Equipment Management.

3.1.4.1. MAFFS tool box will accompany each MAFFS unit to MAFFS deployed locations, if required. Each required tool box will either be attached to, or accompany, the Pintle cart and be downloaded and placed in a secured location at the deployed location.

3.1.4.2. MAFFS Tool Box POC will have all MAFFS tool box torque wrenches calibrated with in the PMEL (Precision Measurement Equipment Laboratory) program. Recommend using WRM (War Readiness Material) account.

**3.2. Redeployment.** The USFS term for “redeployment” is “demobilization.” Retardant mixing facilities (pit pallet and associated equipment) MLO support equipment and MAFFS unit

maintenance equipment should be kept together to facilitate rapid follow-on deployment. Most support equipment may be transported over land when more cost effective or efficient.



## Chapter 4

### PRE-FLIGHT PROCEDURES

**4.1. Crew complement.** Normal crew ratio for MAFFS Airlift Wings is 5.0 crews per MAFFS unit. Two loadmasters are required per crew. Crew complement per wing assumes a normal fire season and two MAFFS units per wing.

4.1.1. All crewmembers will be fully certified in MAFFS operations, IAW AFI 11-2C-130JV1, *C-130J Aircrew Training*, prior to performing operational MAFFS airdrops.

4.1.2. A certified MAFFS Aircraft Commander or MAFFS Instructor Pilot will occupy the left pilot seat for operational MAFFS airdrops.

4.1.3. Crewmembers non-current for MAFFS will regain currency in accordance with AFI 11-2C-130JV1.

4.1.4. Due to the hazardous nature of the mission, personnel other than assigned USAF aircrew members specifically required to accomplish the MAFFS mission, or receive/conduct required MAFFS training, will not fly on MAFFS employment aircraft. Exceptions: USAF Combat Camera staff and other Mission Essential Personnel (MEPs) may fly on missions when accompanied by an MEP approval letter signed by the AEG-WFF/CC. The EAS (P)/MC will advise the MLO when approved personnel other than assigned aircrews are on board.

4.1.4.1. Aircraft needing in-flight maintenance evaluation or live drops for system troubleshooting will not be flown over an actual fire.

4.1.4.2. Familiarization flights of U.S. Government employees (i.e., Lead plane pilots) on MAFFS aircraft during yearly certification training is approved provided the host wing conducts the requisite oversight and documentation IAW AFI 11-401.

4.1.4.3. DV flights will be IAW AFI 11-401.

4.1.4.3.1. Federal mission (Training or Operation) approval authority resides with AEG/CC.

4.1.4.3.2. State mission (Training or Operational) approval request made through state JFHQ (IAW 11-401\_ANG SUP 1).

4.1.4.3.3. OCONUS approval request will be IAW AFI 11-401.

**4.2. Crew Duty and Crew Rest Limitations.** Maximum flight duty period (FDP) for MAFFS missions is 16 hours. MAFFS airdrop is a tactical event. Complete all MAFFS drops during the first 12 hours of the FDP. The AEG-WFF/CC may extend the 12 hour drop limit a maximum of 2 hours with concurrence of the aircraft commander.

4.2.1. MAFFS airdrops will not be planned to occur beyond 8 cumulative flight hours in any single day. Aircraft will not be launched if it is determined the airdrop portion will occur after the 8<sup>th</sup> cumulative flight hour. This does not apply to the return portion of flights after all airdrops have been completed. Due to the possibility of unplanned in-flight delays, any sortie that is launched legally may complete the mission as long as daylight restrictions are met.

4.2.2. MAFFS duty includes flight time, ground duty of any kind, and standby or alert status at any location. Deployment/redeployment is not considered MAFFS duty and will not be included in consecutive day totals in [paragraph 4.2.3](#) below unless tasked for airdrops on the same day as arrival to or departure from the deployed location. In all cases, a crew's flight duty period is IAW AFI 11-2C-130JV3.

4.2.3. Consecutive Duty Day Limitations. During any 14 consecutive days, crewmembers will be off duty for 2 full calendar days. Days off need not be consecutive. This limitation does not include AEG-WFF duties, but does include EAS (P)-WFF/MC duties. For example, a crewmember performs 7 days of MC duties then rolls in to a crew. That person requires 2 days off in 14 days inclusive of their MC duties.

4.2.4. Once the morning briefing is complete, EAS-WFF/MC's may release crews to hotel standby at any time during the day with the concurrence of the MLO. Hotel standby is still considered part of the Flight Duty Period.

4.2.5. Safety will not be compromised at any time. The Aircraft Commander may terminate flying activities whenever crew fatigue or any other factor such as heat or visibility (shadows, smoke, thunderstorms etc.) is deemed unsafe to continue.

**4.3. Hours of Operations.** MAFFS airdrops will only be conducted during daylight hours. Daylight, as implied in AFI 11-401, is that time beginning 30 minutes prior to official sunrise and ending 30 minutes after official sunset. This does not apply to emergency jettison of retardant, which can be accomplished at any time. Take-offs and recoveries may be accomplished outside of daylight hours. All airtanker bases have official Sunrise/Sunset tables for their local areas.

**4.4. Interfly Agreement.** For federal activations, aircrew interfly between Wings with same MDS is authorized. Additional approval required by AFI11-2C-130V3J and AFI 11-401 is not required. State activations will follow normal approval levels. All existing aircraft qualifications and MAFFS training and currency requirements apply. EAS (P)-WFF/MC will coordinate with the AEG-WFF and home units to verify individual Go/No-Go criteria are met. Flight authorizations shall accurately reflect each crew composition at all times. Any flight authorization write-in changes will be coordinated with the AEG-WFF and EAS C2 personnel before any mission can depart.

**4.5. Communications.** USFS MAFFS FM radios will be installed in MAFFS aircraft.

4.5.1. FM radio operating manuals, available from the MLO, will be maintained on the aircraft.

4.5.2. If the USFS MAFFS FM radio is inoperative, mission execution may continue, when authorized by the MLO, if a suitable alternate method of communications and flight following is employed. The MLO should coordinate alternate communications plan with the appropriate Geographic Area Coordination Center (GACC) and dispatch.

**4.6. Flight Planning.**

4.6.1. The Aircraft Commander is responsible for all normal flight planning IAW AFI 11-2C-130JV3. When available the EAS (P)/MC will provide additional support as coordinated with the deployed aircrew.

4.6.2. For employment missions flown strictly under VFR, the flight following procedures listed in [paragraph 6.3](#) satisfy AFI 11-202V3 flight plan filing and search and rescue procedures.

**4.7. Aviation Operational Risk Management (ORM).** ORM does not replace sound judgment nor replace “safety of flight” decisions by the aircraft commander or leadership. In situations where accomplishing the provisions of this Addenda B ORM guidance is impractical, final mission acceptance authority remains with the aircraft commander. In unique situations, process (not worksheet) variations are authorized as long as the intent of this instruction is followed.

4.7.1. MAFFS ORM Worksheet. The MAFFS ORM Worksheet is the standardized MAFFS ORM tool for risk evaluation, identification, scoring, and acceptance. The office responsible for the current MAFFS ORM Worksheet is HQ AMC/SEF. The most current version of the worksheet and fatigue scoring card can be found on the HQ AMC/SE website link: <https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC134B5F0FB5E044080020E329A9> under the AMC Aviation ORM tab at the Local Unit ORM Worksheets sub tab. MAFFS units may desire periodic adjustments to the worksheet and may submit requested changes to NGB/SEF, AFRC/SEF and AMC/SEF ORM for review, coordination, and posting.

4.7.2. Risk Assessment. Aircraft Commanders will accomplish and document Operational Risk Management (ORM) calculations for their mission prior to the first flight every day using the latest version of the MAFFS ORM Worksheet. Due to the dynamic nature of MAFFS operations, it is not possible to always predict the location of fires, nor the location to which the aircraft will be directed. For clarity, the Weather and Mission sections of the Worksheet refer to risks at the airport of departure and planned recovery. Use best judgment in assessing risk for enroute and airdrop portions of sortie(s). Prior to the start of each crew duty day every crew member will use the Health, Stress, and Fatigue scorecard on page 2 of the MAFFS ORM Worksheet to self-evaluate their current health/stress and fatigue risk level. The aircraft commander will tally the results, select the highest health/stress and fatigue score, and enter this value as the crew’s “Human Factor” score.

4.7.2.1. The aircraft commander must sign and date the signature block of the Worksheet for each crew duty day. Any time the mission risk level is above LOW, enter the approval authority's last name (or initials), rank, office symbol and date of approval in the appropriate signature block at the bottom of the worksheet. All signatures and associated coordination must be accomplished before engine start. Document the ORM score in the appropriate block of the MAFFS Drop Log.

4.7.2.2. ORM scores that elevate mission approval to an authority higher than the aircraft commander will be relayed to that authority as soon as practical, but in all cases, approval for mission execution will be received before engine start. Though the MAFFS ORM Worksheet does not need to be re- accomplished for subsequent sorties during the FDP, it is imperative aircraft commanders and crew assess mission complexity, environmental factors impacting aircraft and human performance, and aircraft systems limitations to determine if mission risk is elevated. In the event the ORM mission risk level has increased above the previously approved level and the aircraft commander, after exhausting all communications options and is unable to contact EAS or EAG leadership,

will carefully consider and evaluate the risk associated to the crew, aircraft, the current environment and other factors affecting the mission before continuing.

**4.8. MAFFS Loading/Cargo Restrictions.** The MAFFS unit will be loaded, installed and unloaded under the supervision of a MAFFS qualified loadmaster IAW TO 1C-130J-9, *C-130J Cargo Loading Manual*. The following restrictions apply:

4.8.1. At least two (recommend four) Emergency Landing Gear Restraint straps will be carried on aircraft loaded with the MAFFS unit.

4.8.2. Maximum cargo weight on the ramp is limited to 1,500 pounds when the MAFFS unit is installed and loaded with any amount of liquid.

4.8.3. MEP's are permitted on MAFFS aircraft during deployment, positioning, and redeployment legs only. Personnel are not permitted between Load Station 345 and the forward edge of the MAFFS unit during takeoff and landing.

**4.9. MAFFS Tanker Basing.** MAFFS aircraft will reload/service retardant and/or compressed air at air tanker reloading bases/facilities approved IAW the MAFFS Operating Plan.

4.9.1. At the request of the USFS, additional bases/facilities may be approved by the AEG-WFF/CC when surveyed and approved by a trained and qualified MAFFS Instructor Pilot or as directed by the AEG-WFF/CC.

4.9.2. MAFFS retardant reload bases and facilities will be surveyed using an approved MAFFS Airfield Evaluation Checklist to ensure sufficient operational aerial firefighting support capabilities. The survey products will be uploaded to the Supplemental Theater Information File (STIF) section of the AMC Airfield Suitability and Restrictions Report.

4.9.3. The AEG-WFF/CC will ensure a MAFFS Site Survey has been conducted and the airfield is suitable for planned MAFFS operations before approval of any tanker base for MAFFS reload operations.

4.9.4. Aircraft Rescue and Fire Fighting (ARFF) requirements. Operational MAFFS missions are authorized to reload at airfields having ARFF vehicles with at least a 1500 gallon capacity and at least 3 fire fighters. This capability represents the amount of agent needed to execute rapid intervention at one location of the aircraft that is involved in a small fire. At this level, rescue is not expected from inside the aircraft. This level of service represents increased risk/loss potential due to the lack of sufficient agent to maintain control of exterior or interior fire long enough to conduct interior rescue operations. The main MAFFS bed down base(s) will comply with AMCI 11-208, *Tanker/Airlift Operations* requirements. All MAFFS training missions will comply with AMCI 11-208 requirements.

4.9.5. MAFFS Tanker Bases are categorized as follows:

4.9.5.1. **R = Reload** – approved for loading retardant using existing pits. Verify personnel in place.

4.9.5.2. **H = Hub** – approved for loading using existing pits. May also be used for overnight and staging of maintenance. Most advantageous for activations.

4.9.5.3. **F = Full Activation** – approved for loading using existing or portable pits provided by the region. May also be used for overnight and staging of maintenance and support. Additionally, this location may be used to set up larger operating facilities.

4.9.6. AEG-WFF/CC will conduct an annual MAFFS tanker base suitability review of airfields intended for use during the fire season. The review, as a minimum, will verify ARFF capabilities and weight bearing capacity. Results will be published in the MAFFS Operating Plan.

## Chapter 5

### GROUND OPERATIONS

**5.1. Servicing Pit Procedures.** Servicing pit assignments, engine start, takeoff sequencing, marshaling and parking instructions will be directed by the Air Tanker Base. Outboard engines should be shut down prior to entering the pit servicing area; however, some rotation is acceptable in high wind conditions.

5.1.1. If conditions permit, do not start outboard engines until reaching an uncongested area clear of the pit servicing area. If the outboard engines were not started before taxiing out of the pit servicing area, ensure “Starting Engines” and “Before Taxi” checklists are reviewed and fully accomplished before proceeding with the “Before Takeoff” checklist. The aircraft commander will brief taxi clearance and engine stop start duties in the crew brief. After the outboard engines are started, ensure applicable items in Starting Engines and Before Taxi checks have been completed for all engines.

5.1.2. Pit Operations/Tanker Base operations are IAW the Standardized MAFFS Tanker Base Concept of Operations ([Attachment 3](#)).

5.1.3. A specific individual will be designated as the servicing pit supervisor for each operating pit. The pit supervisor will be easily identifiable by wearing high visibility vest. Where USAF maintenance (MX) personnel are available, the MC should consider coordinating with the MLO or Air Tanker Base Manager (ATBM) for their use as Parking Tenders (i.e. Marshalls) for the MAFFS C-130 aircraft. As a minimum, USAF MX personnel will ensure civilian Parking Tenders conduct marshaling / pit operations IAW AFI 11-218, *Aircraft Operations and Movement on the Ground* and the Interagency Air Tanker Base Operating Guide (IATABOG). Duties will include the following:

5.1.3.1. Marshall aircraft into the pit.

5.1.3.2. Stationed in front of the aircraft, act as a safety observer/refueling supervisor.

5.1.3.3. Communicate with aircrew via intercom cord plugged into an external intercom jack, hand signals, or radio on tanker base frequency.

5.1.4. Aircraft will be chocked while being serviced in the pit. A set of aircraft chocks will be available in each pit.

5.1.5. Fuel servicing will be under the direction of the servicing supervisor. If authorized per the MAFFS Operating Plan, concurrent servicing will be in accordance with T.O. 00-25-172.

5.1.6. Aircraft fuel or retardant servicing with engines running is not authorized. **CAUTION:** Consult T.O. 1C-130J-1, *C-130J Flight Manual*, Section 1 (LIMITATIONS) for minimum fuel quantities, weights, maneuver load factors and airspeed limitations. Ensure maneuver load factors are not exceeded.

5.1.7. Pit personnel will not approach the aircraft until the propellers have stopped turning and the loadmaster has cleared them to do so.

5.1.8. Use of external power should be coordinated with the ramp manager due to congestion and other aircraft's use of the pits. External power should be used when extended pit

operations are anticipated, such as during initial load, when directed to “return and hold”, or when aircraft or MAFFS unit maintenance is required, or as requested by the Aircraft Commander.

5.1.9. Whenever possible after each MAFFS sortie, retardant buildup will be washed free from the empennage using high pressure water. The aircraft empennage will be thoroughly washed after the last sortie of the day.

5.1.10. Nozzle Assembly Armed indicator. This safety feature is required for MAFFS certification by the USFS. Personnel will not travel aft of the nozzle when the armed light is on. The armed indicator light on the MAFFS nozzle provides a visual warning to personnel that are outside the aircraft.

5.1.11. Wet firing/flushing the system/emergency drops while on the ground/in the pits. Prior to accomplishing any wet fire/ground flushing, coordination will take place with the Tanker Base Manager, Ramp Supervisor, and Military Maintenance. CAUTION: MAFFS cabin controls will not be manipulated until an area approximately 150 ft behind the flushing aircraft is cleared of all personnel and loose objects. Another airtanker may be behind the aircraft in normal pit position but it will not have any AGE near it, connected, or operating.

## Chapter 6

### FLIGHT OPERATIONS

**6.1. MAFFS Aircraft Performance.** MAFFS airdrops are frequently performed at high density altitudes, high temperatures and at heavy gross weights. **WARNING:** Aircraft climb performance is significantly reduced due to the high-drag configuration (nozzle drag and 100% flap airdrop configuration). Under certain density altitude conditions, three- engine climb capability may not be available.

6.1.1. Regardless of phase of flight, it is crucial to dump the retardant load either by normal or emergency drop methods anytime aircraft performance is in question. Should maximum climb performance be required, simultaneously jettison retardant, apply maximum power, and decrease drag by setting flaps to 50% or less as soon as possible.

6.1.2. Aircraft Drag Index. The external MAFFS nozzle assembly increases aircraft drag over all flight regimes. Aircrew will ensure the additional drag is factored into TOLD performance calculations whenever the nozzle assembly is installed. Reference TO 1C-130(C)J-1-1, Section 1 for applicable drag index. **Note:** The drag index for the MAFFS nozzle is 20. Drag index is cumulative. Ensure all aircraft drag factors are considered.

6.1.3. VFR Departures and Engine-Out departure planning. All-engine minimum climb gradient capability ensures obstacle avoidance along the planned departure route. Engine-out climb gradient capability ensures that in the event of engine failure, the planned departure or emergency return route provides obstacle avoidance. As a minimum, MAFFS equipped aircraft, loaded with retardant or water, must be capable of climbing at a rate of at least 200 feet-per-minute (fpm) on three engines at obstacle clearance speed, or climb gradient required for obstacle clearance for the planned route of flight. Crews will use the "TAKE-OFF GROSS WEIGHT LIMITED BY THREE ENGINE CLIMB PERFORMANCE" chart from T.O. 1C-130(C)J-1-1 to calculate the projected climb rate. This climb rate is in lieu of the required climb gradient of 152 feet-per-nautical mile. The following restrictions will be met:

6.1.3.1. MAFFS equipment will be configured for emergency dump during takeoff.

6.1.3.2. A fully operational MAFFS hydraulic system (accumulators charged to 2500 PSI minimum) is required prior to takeoff with liquid onboard.

6.1.3.2.1. A ferry flight is permitted with liquid on board for flight to MAFFS Maintenance Base with <2500 PSI MAFFS hydraulic pressure with normal climb gradient and WFF-AEG/CC concurrence.

6.1.3.3. Aircrew will accomplish detailed engine-out departure planning to avoid high terrain and built- up areas to the maximum extent possible.

6.1.4. IFR Departures and Engine-Out departure planning. If an IFR departure is required, aircrew will comply with normal IFR departure procedures.

6.1.5. Takeoffs and landings may be conducted in IMC.

### 6.2. MAFFS Limitations:



6.2.1. MAFFS airdrops will be flown under the supervision of a MAFFS qualified Leadplane or Aerial Supervision Module (ASM).

6.2.2. Cabin pressurization is limited to 10 in Hg (5 psid) or less with the MAFFS door plug installed.

6.2.3. MAFFS System Bonding:

6.2.3.1. MAFFS aircraft that have been bonded (IAW Instructions for bonding MAFFS II equipment – 2013-05-07) have no additional thunderstorm avoidance restrictions.

6.2.3.2. MAFFS aircraft that have not been bonded must avoid thunderstorms by at least 25nm when any portion of the MAFFS unit extends outside the aircraft. **WARNING:** The MAFFS nozzle assembly is not appropriately bonded to the aircraft for lightning strike dissipation. Possible electrical shock to operators could result.

6.2.4. Personnel are not authorized between FS 245 and the MAFFS system during takeoff and landing operations.

6.2.5. Takeoffs may continue with Master Warning indications for left paratroop door open indications. This is a known anomaly that may occur with the MAFFS door plug installed.

6.2.6. Operation of galley equipment during MAFFS compressor operations may exceed maximum generator loads.

6.2.7. Operation of the MAFFS compressors in icing conditions may exceed maximum generator loads. If icing conditions are anticipated, ensure Compressor Enable switch is in the OFF position.

### 6.3. Flight Following.

6.3.1. The goal of flight following is to have contact with all fire-fighting aircraft at least once every 15 minutes by either Dispatch, Air Traffic Control, Lead Plane, or Air Tactical Group Supervisor (Air-Tac).

6.3.2. Automated Flight Following. 1 AF (AFNORTH)/A3O will provide “Friendly Force Tracker” equipment for automated flight following (AFF) of all MAFFS configured aircraft. Trackers should remain on from takeoff to landing for all MAFFS missions. Batteries must be changed daily after use to ensure proper operation and signal reception.

6.3.3. Advise the departure tanker base of “rolling” (AFTO 781 takeoff time). After takeoff, contact dispatch and report location, destination fire or base, ETA, souls on board, and fuel in hours. If positive AFF, further calls are not required until departing the fire for return to base. If negative AFF, repeat with previous data every 15 minutes until in contact with Lead or Air-Tac. Terminate flight following upon return to base when in contact with tower or upon landing. Call “Stopped” (AFTO 781 land time) to the ATB radio operator. ATB personnel will relay times to AEG-WFF for GDSS input.

6.3.4. All MAFFS aircraft will enter transponder code of 1255 en-route to, within, and from the Fire Traffic Area (FTA), unless Air Traffic Control (ATC) assigns a different code.

6.3.5. Due to the fluid nature of WFF operations, MAFFS aircrew should be prepared to respond to short notice re-tasking requests through the dispatch system. Re-tasking requests

may require operations at a new fire and / or air tanker base. Aircrew will perform a thorough risk assessment prior to accepting any re-tasking.

6.3.5.1. If re-tasked within the same fire complex, the aircrew may proceed without further coordination, as long as ORM remains within aircraft commander line of authority.

6.3.5.2. If re-tasked to a new fire complex and / or ATB within assigned GACC; mission may continue with concurrence of Mission Commander. Dispatch will coordinate.

6.3.5.3. If re-tasking is to fire complex and / or ATB outside of assigned GACC, AEG concurrence is required. Dispatch will coordinate.

**6.4. Fire Traffic Area.** [Attachment 4](#) and the glossary define the Fire Traffic Area (FTA). The FTA utilizes a 5 nm radius from the incident latitude and longitude for initial attack incidents but may grow as the fire grows. Good practice is to consider the FTA boundary being at least 5 nm from the perimeter of the fire.

6.4.1. The FTA can flex vertically depending on operational requirements of participating incident aircraft or by the requirements of the incident itself.

6.4.2. Radio communication for clearance to enter the FTA should be initiated at 12 NM from the incident latitude and longitude.

6.4.2.1. The maximum airspeed in the FTA is 150 KIAS. This does not preclude momentary speeds in excess of 150 KIAS for rejoin and formation maneuvering requirements.

6.4.3. Do not penetrate 7 NM from the coordinates or approximate perimeter of the fire, whichever is greater, unless permission is granted by controlling aircraft. If radio contact is not established prior to 7 NM, hold no closer than 7 NM from the fire (normally left turns) until contact is made and permission is granted to enter the FTA.

## **6.5. Lead plane procedures.**

6.5.1. The Air Tactical Group Supervisor (ATGS) (commonly referred to as Air-Tac, see glossary) normally makes right hand orbits over the fire. Air-Tac (if on-scene) or the Lead Plane will establish air traffic control over the fire using the following criteria.

6.5.1.1. Air-Tac (if on scene) should be at an altitude above air tankers.

6.5.1.2. The Leadplane Pilot or Aerial Supervision Module (ASM) (see glossary) should remain at or below the air tanker orbit.

6.5.2. The Lead Plane or ASM will:

6.5.2.1. Establish the orbit altitude and location.

6.5.2.2. The orbit point should allow air tankers to observe preceding drops.

6.5.2.3. Establish drop sequence and call for each tanker when ready.

6.5.2.4. Describe the target, drop objective, approach heading, altitude, and suggested escape route and will advise on hazards, altimeter setting, desired coverage level, quantity, and other pertinent factors.

6.5.2.5. Inform air tankers of potential airdrop hazards to include: reduced visibility from smoke, shadows from reduced light, terrain, wind/turbulence, trees/snags, other air traffic, structures such as towers, antennas, power-lines etc.

6.5.2.6. Lead/supervise/direct MAFFS aircraft throughout the approach and airdrop and, if required, give the execution command over the release point.

6.5.2.7. Critique the airdrop (on target, short, right, etc.) if time and conditions permit.

6.5.3. Separation responsibilities. When entering the FTA and joining on the lead plane, use TCAS and visual scanning to acquire lead. Normally lead will acquire the airtanker first. Lead will maintain an altitude separation for de-confliction until they have the airtanker in sight. When the lead states they have the airtanker in sight, formation separation is lead's responsibility. Once the airtanker states they have lead in sight, separation responsibility is transferred to the airtanker. If the airtanker subsequently loses sight of lead, it is imperative to notify lead so they can either assume separation responsibilities or assign altitude separation if not in sight.

6.5.3.1. Select TA Only on the IFF prior to entry into the FTA to prevent nuisance resolution advisories with the leadplane.

## **6.6. Airdrop Procedures.**

6.6.1. The "SLOWDOWN" checklist must be completed prior to descending from entry altitude. Ensure both pilots understand the target area and escape route prior to commencing the drop approach. For multiple passes in the same drop area complete asterisk items in the SLOWDOWN CHECKLIST prior to initiating the ONE MINUTE ADVISORY. If the system is disarmed between drops, re-accomplish all checklists starting with the AFTER TAKEOFF (LM) and PRE-SLOWDOWN (Cockpit Crew) checklists.

6.6.1.1. The MAFFS system is designed to drop any sequence or number of drops from one full tank (3000 gallons) using one full charge of high pressure air (1200 psi), and normally does not require additional air compression between drops.

6.6.2. A "show-me" run may be required depending on target complexity, previous drops observed, and other factors. MAFFS aircraft loaded with retardant should remain at an altitude well above the Lead Plane performing a show-me run. This altitude should be at pattern altitude for the respective drop location, normally 1,000' AGL above drop altitude as directed by the lead plane pilot.

6.6.2.1. During a show me run configure and maneuver the aircraft so both the pilot and co-pilot can observe the target. This may require flying a different ground track than lead and banking the aircraft as lead approaches the intended target area so both pilots have visibility on the target.

6.6.3. Baseline pattern airspeeds and flap configurations for the actual drop are 140 KIAS/50% flaps on downwind, 130/70% flaps on base, and 120/100% (or 120/70% or less flaps for level drops) flaps on final. These speeds and configurations may, and will be modified as required by the aircraft commander depending on spacing from lead, offset positioning from lead, energy management, turbulence, terrain, etc.

6.6.4. Baseline spacing from lead in the drop pattern should be approximately 1500 ft (+/- 500 ft) (5 to 10 seconds behind lead plane at typical drop pattern airspeeds) but may vary

based on conditions and target acquisition. Spacing too close can lead to dangerous situations due to overruns. When able, fly above and offset from lead to maintain energy and allow the lead to keep the MAFFS aircraft in sight as much as possible.

6.6.4.1. It is important for the pilot to keep the target as well as the lead plane in their cross check to anticipate and avoid a situation leading to an overshooting final, and also to facilitate arriving at the start point in drop parameters.

6.6.5. Overrun procedures. Should the MAFFS overrun the lead plane, the MAFFS announces overrun on air to air frequency, the lead plane maneuvers down and left, and the MAFFS maneuvers up and right to allow the MAFFS pilot to keep the lead plane in sight, regain position, and advise lead. If in a turn (or terrain is a factor), the MAFFS announces overrun, lead maneuvers down and to the inside of the turn (or towards the terrain), and the MAFFS maneuvers up and to the outside of the turn (or away from the terrain).

6.6.6. Ascending drops or escapes and daisy chain drops are prohibited.

6.6.6.1. Drops into rising terrain are acceptable if maintaining level flight at an acceptable terrain clearance altitude throughout the drop (for example with a hard deck MSL altitude given).

6.6.7. Tandem drops are allowed providing the aircraft commander concurs, is in a position to observe the preceding drop, information listed in [paragraph 6.4](#) has been received from the lead plane, and the lead plane can maneuver to supervise the drop.

6.6.8. Drop Altitude. 150 feet AGL Minimum.

6.6.8.1. When terrain and conditions permit, target an altitude approximately 150 ft above the fuel. Altitudes between 150 and 200 ft AGL are generally effective but in order to achieve coverage levels 6 and 8, altitudes near 150 ft AGL are required. Above 200 ft AGL the drop pattern begins scalloping and rapidly becomes ineffective.

6.6.9. Minimum drop airspeed is 120 KIAS, or as required for aircraft performance. Higher speeds may be needed due to turbulence, terrain, turning drops, etc. Ultimately, the aircraft commander determines what airspeed and flap setting is appropriate for each drop.

6.6.10. Terminology on final to the drop:

6.6.10.1. Stating “I have the line” to lead means the MAFFS pilot has the target start/stop points in sight, knows the desired lateral placement of the drop, and has cleared the lead to pull off the line and maneuver to observe the drop.

6.6.10.2. Stating “Hold the line” to lead means the MAFFS pilot needs lead to continue on the drop line in order to assure acquisition of the correct start/stop points or lateral line location.

6.6.11. Leadplane pilots will normally fly their aircraft over the desired ground track which corrects for wind drift and expect the air tanker to fly that same ground track. If desired otherwise, they will specify or they may direct last minute adjustments to the air tanker via air to air radio.

6.6.12. Exit/escape. Upon load clear, or completion of drop if a start/stop drop, simultaneously add power, retract flaps to 50% when able, and begin climb. Do not climb

into the Air-Tac or other air tanker altitudes when exiting until clear of the FTA. To enhance traffic avoidance, select TA/RA as soon as possible once separating from lead after the drop.

6.6.13. Avoid application of retardant or foam within 300 ft of waterways (any body of water, lakes, rivers, streams, ponds, etc.).

6.6.14. MAFFS normally should not land fully loaded. However, it is permissible to do so when landing performance and conditions permit. The MAFFS load will be jettisoned prior to making approach and landing with an engine out.

## **6.7. Jettison Procedures.**

6.7.1. Jettison areas must be designated by the controlling agency. If the jettison location is designated by the controlling agency to be a fire incident, clearance must be obtained from the controlling Incident Commander and the controlling aircraft prior to entering the FTA.

6.7.2. A Leadplane is not required to jettison a load; however, the airtanker should drop at a minimum of 500 feet above ground level (AGL). (150 feet minimum if on an airfield)

6.7.3. If a dispatch is cancelled after loading of retardant, the MLO will normally coordinate with the MC for the offload or jettison of the load within 72 hours.

6.7.4. All emergency and inadvertent retardant jettisons will be reported to the MLO via the EAS-WFF/MC, dispatch, or nearest air tanker base. Include location of the drop and additional pertinent information.

**6.8. Post Flight.** MAFFS crews will document every sortie on the MAFFS Drop Log in [Attachment 5](#). Use one log per local flying day. All takeoff and landing times on the drop log will be annotated in local time reference the actual takeoff and landing location, not the EAS or AEG-WFF locations. Takeoff and landing times and flight times should mirror the 781 times exactly (converted to local). Every block on the Drop Log is required for each sortie except Remarks. Write “UNK” or “N/A” for those blocks where data is not available or applicable.

6.8.1. Crews will submit totaled Drop Logs to AEG (EAS (P), if available) operations personnel at the end of each day, unless no flying occurred. If a crew is not able to return to the EAS location due to WX, MX, etc, crews should make every effort to FAX the completed and totaled Drop Log to the AEG or EAS (P) before entering crew rest.

6.8.2. Due to the nature of the mission, MAF Fuel Tracker information is not required to be submitted to the AMC fuel efficiency office.

## **6.9. MAFFS System Maintenance.**

6.9.1. MAFFS aircrew will notify the EAS (P)/MC of MAFFS system discrepancies as soon as conditions permit. The Loadmaster will enter MAFFS system discrepancies in the MAFFS maintenance log. Each discrepancy will be reported to and corrected by the MAFFS maintenance personnel (FSR) assigned to the mission as soon as practical.

6.9.2. Upon demobilization, MAFFS retardant tanks will be flushed two times with water after final retardant load. A ground flush is preferred. If this is not an option, an airborne flush may be performed. Coordinate desired jettison location with EAS (P)/MC and the MLO / ATBM.

BURTON M. FIELD, Lt Gen, USAF  
DCS Operations, Plans and Requirements

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AMC, Modular Airborne Fire Fighting (MAFFS) Concept of Operations, *Phoenix Forest*, Sep 2010

Interagency Agreement for the Provision of Temporary Support During Wildland Firefighting Operations

FSI 12-001, *2012 MAFFS Operating Plan*, 24 February 2012

AFNORTH WFF OPORD 2010

USFS MAFFS II Aerial Delivery Compliance Report, 12 August 2008

T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*, 10 February 2011

TO 1C-130J-1, *C-130J Flight Manual*, 1 July 2012

T.O. 1C-130J-9, *Cargo Loading Manual*, 1 July 2012

T.O. 1C-130A-21, *Equipment Inventory List, C-130 Airplanes*

AFI 11-2C-130JV3 Addenda A, *C-130J Operations Configurations/Mission Planning*, 9 December 2009

AFI 11-2C-130J, Volume 3, *C-130J Operations Procedures*, 22 September 2011

AFI 11-218, AMC Sup, *Aircraft Operations and Movement on the Ground*, 26 May 2011

AFI 11-401, *Aviation Management*, 9 January 2013

AFI 21-101 AMC Sup, *Aircraft and Equipment Maintenance Management*, 1 Jan 2013

AMCI 11-208, *Tanker/Airlift Operations*, 1 Jun 2000

Instructions for bonding MAFFS II equipment – 2013-05-07

***Adopted Forms***

AF Form 847, *Recommendation for Change of Publication*

AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document*

***Abbreviations and Acronyms***

**AEG**—Air Expeditionary Group

**AEG-WFF/CC**—AEG Wildland Fire Fighting Commander

**AFF**—Automated Flight Following

**AFI**—Air Force Instruction

**ARFF**—Aircraft Rescue and Fire Fighting

**ASM**—Aerial Supervision Module

**ATGS**—Air Tactical Group Supervisor (Air-Tac) BLM – Bureau of Land Management

**EAS**—Expeditionary Airlift Squadron

**EAS (P)-WFF/MC**—EAS Wildland Fire Fighting Mission Commander

**FSR**—Field Support Representative (MAFFS Mechanic) FTA – Fire Traffic Area

**HLCO**—Helicopter Coordinator

**IC**—Incident Commander

**ICS**—Incident Command System

**MABM**—MAFFS Airtanker Base Manager

**MAFFS**—Modular Airborne Fire Fighting System

**MC**—Mission Commander

**MLO**—MAFFS Liaison Officer

**MAJCOM**—Major Command (for the purposes of this AFI, includes ANG)

**NIFC**—National Interagency Fire Center

**TCAS**—Traffic Collision Avoidance System

**TFR**—Temporary Flight Restriction

**USFS**—United States Forest Service

**WFF**—Wildland Fire Fighting

### ***Terms***

**Aerial Supervision Module**— An ASM is a two person crew functioning as the Lead and ATGS from the same aircraft. The ASM crew is qualified in their respective positions and has received additional training and authorization. An ASM can be utilized as a Lead, ATGS, or both, depending on the needs of incident management personnel. An ASM consists of an Air Tactical Pilot and Air Tactical Supervisor.

**Air Tactical Pilot (ATP)**— a) The ATP is a qualified Leadplane Pilot who has received specialized training and authorization to function as an ASM crewmember. The ATP functions as the Leadplane pilot and utilizes Crew Resource Management (CRM) skills to evaluate and share the incident workload with the ATS.

**Air Tactical Supervisor (ATS)**— b) The ATS is a qualified ATGS who has received specialized training and authorization to function as an ASM crewmember. The ATS is an ATGS who also utilizes CRM to evaluate and share the incident workload with the ATP.

**Air Tactical Group Supervisor**— Commonly called “Air-Tac”. The ATGS manages incident airspace and controls incident air traffic. The ATGS is an airborne firefighter who coordinates, assigns, and evaluates the use of aerial resources in support of incident objectives. The ATGS is the link between ground personnel and incident aircraft. The ATGS must collaborate with ground personnel to develop and implement tactical and logistical missions on an incident. The ATGS must also work with dispatch staff to coordinate the ordering, assignment, and release of incident aircraft in accordance with the needs of fire management and incident command personnel.



**On initial attack incidents (type 4 and 5), the ATGS will size—up, prioritize, and coordinate the response of aerial and ground resources until a qualified Incident Commander (IC) arrives. On complex incidents (type 1, 2, or 3), the ATGS will coordinate and prioritize the use of aircraft between several divisions/groups while maintaining communications with operations personnel and aircraft bases (fixed/rotor).**

In the Incident Command System (ICS), the ATGS works for the IC on initial attack and the Operations Section Chief (OSC), Air Operations Branch Director (AOBD), or operational designee on extended attack. The ATGS supervises the ATCO, Leadplane Pilot, and the HLCO positions when activated. The ATGS is qualified to function as an ATCO or HLCO.

**Air Tanker Coordinator (ATCO)—** The ATCO coordinates, directs, and evaluates airtanker operations. The ATCO works under the ATGS. This position is typically activated on complex incidents where several airtankers are assigned. An ATCO can reduce the span of control of the ATGS by managing all the airtankers over an incident. If no ATGS is present, the ATCO works for the IC. **The ATCO is not authorized for low level (below 500' AGL) operations.** (Historically, the ATCO position without the low level capability per this definition is not used. The ATGS normally fills this role. ASM or Leadplane Pilots are the standard for low level lead duties.)

**Daisy Chain Drop—** A retardant drop immediately behind another air tanker. Not allowed in MAFFS operations due to danger of flying into leading aircraft's retardant and inability of the lead aircraft to assess the first drop before the second aircraft drops.

**Fire Traffic Area—** A Fire Traffic Area (FTA) is defined as airspace created by a land management agency to encompass a location where aerial firefighting aircraft are operating. The FTA is not part of the National Airspace System although a FTA may be contained within a Temporary Flight Restriction (TFR). The FTA was developed by aerial firefighting personnel to provide a standardized initial attack airspace structure to enhance air traffic separation for all aircraft over wildland fire (or other) incidents. See [Attachment 4](#).

**Helicopter Coordinator (HLCO)—** The HLCO coordinates, directs, and evaluates tactical/logistical helicopter operations. The HLCO works under the ATGS. This position is typically activated on complex incidents where several helicopters are assigned. A HLCO can reduce the span of control of the ATGS by managing all the helicopters over an incident. If no ATGS is present, the HLCO works for the IC, AOBD, or designee.

**Leadplane Pilot (Lead)—** The Leadplane position is identical to the ATCO except the pilot is qualified and authorized for low level operations. A Leadplane Pilot is not recognized in ICS and is classified as an ATCO by default. The low level capabilities of a Leadplane enhance the safety and effectiveness of airtanker operations in the often turbulent, smoky, and congested fire environment.

**Tandem Drop—** Normally accomplished to extend the line from a previous drop. First air tanker drops behind the lead aircraft. The second air tanker is in position to observe the first drop but is far enough apart to eliminate any possibility of flying through the previous retardant and allow the lead aircraft to assess the first drop, but is also positioned close enough so the lead plane can still monitor the second drop after turning off the first drop line.

## Attachment 2

## C-130J STALL SPEED REFERENCE CARD

Figure A2.1. C-130J Stall Speeds.

C-130J-30 STALL SPEEDS									
		Bank Angle					Bank Angle		
Gross Wt.	Flap %	0	30	45	Gross Wt.	Flap %	0	30	45
<b>110</b>	0%	107	116	128	<b>135</b>	0%	119	128	142
	50%	96	103	114		50%	106	114	126
	100%	89	96	106		100%	99	106	117
<b>115</b>	0%	110	118	131	<b>140</b>	0%	121	130	145
	50%	98	105	117		50%	108	116	129
	100%	91	98	108		100%	100	108	120
<b>120</b>	0%	112	121	134	<b>145</b>	0%	123	133	147
	50%	100	108	119		50%	110	118	131
	100%	93	100	111		100%	102	110	122
<b>125</b>	0%	115	123	137	<b>150</b>	0%	126	135	150
	50%	102	110	122		50%	112	120	133
	100%	95	102	113		100%	104	112	124
<b>130</b>	0%	117	126	139	<b>155</b>	0%	128	137	152
	50%	104	112	124		50%	114	122	135
	100%	97	104	115		100%	106	114	126

**Attachment 3****STANDARDIZED MAFFS TANKER BASE CONCEPT OF OPERATIONS****MAFFS Pilot Air Tanker Base Guide  
(General Section: 2013)****Standardized MAFFS Tanker Base Concept of  
Operations**

References: Interagency Air Tanker Base Operating Guide, MAFFS Operating Plan

The following is a chronological flow for operating the C-130J MAFFS aircraft on an approved USFS, CalFire or Joint Tanker Base Ramp. It is intended to align MAFFS air tanker operations with standard civilian tanker doctrine to ensure seamless integration at select air tanker bases.

**Arrival****Airborne**

- Contact Tanker Base 10 minutes prior to arrival on published VHF Tanker Base (TB) Operations Frequency with intentions and requirements (eg Load and Return, 3000 gal retardant, 10K fuel)

**Ground Operations**

- Contact Ramp Manager for Pit Assignment on TB Freq prior to taxiing onto TB Ramp
- Park as directed  
Do not enter the ramp pits until outboard propeller rotation has stopped (Exception: C-130J may enter pits with outboards rotating slowly in high wind conditions)

Ramp Manager (Green Vest) can communicate via VHF and may provide marshaling instructions

Parking Tenders (Orange Vest) generally provide marshalling instructions into pits, during periods of heavy tanker traffic, using standard military signals (see Figure 1)

- Call “MAFFS ‘X’ Stopped” to TB Operations once parking brake is set (X=

**MAFFS**

unit)

TB personnel will relay On & Off times to AEG

Retardant Loading Crew (Blue Vests or Red Shirts) will not approach the aircraft until directed by the Loadmaster, once all propeller rotation has stopped. The loadmaster will ensure the MAFFS system is disarmed prior to clearing the load attendant to approach.

During initial loading operations, A/C will receive an orientation briefing from Air

Tanker Base Manager (ATBM) or representative (See AFI11-2C-130JV3 Add B, Pg 25)

**Departure****Ground Operations**

Engine Start will be in coordination with the Parking Tender via Hand Signals

- 1) PF holds up three fingers to indicate Start #3
- 2) Parking Tender will Point to #3 engine and signal when cleared to start

Dispatch will relay any mission changes to the aircrew via TB Operations personnel using the Standard Interagency Dispatch Form

- Call for Taxi from ATC / CTAF a/r, and taxi as directed  
Taxi lights 'on' indicates "ready for taxi" to the Parking Tender
- Call 'MAFFS X Rolling' on TB Dispatch frequency

**Airborne**

- Contact En route Dispatch or National Flight Following a/r

Figure A3.1. Airtanker Base Ramp Operations Hand Signals.



NOTES: \*Extracted from the Interagency Airtanker Operations Guide

(\*\*) With the exception of the Hot Brakes signal, all others are consistent with AFI 11-218

### **Tanker Base Pilot Orientation Briefing Guide**

The Tanker Base Pilot Orientation Briefing should be conducted between the MAFFS pilot and Air Tanker Base Manager (ATBM) or representative prior to conducting recurring operations at a particular air tanker base facility. This does not preclude servicing in pits on initial stop, if required.

Most ATBMs publish a local Pilot Orientation Package. As a minimum review the following with the appropriate tanker base representative:

#### **Air Tanker Base Manager**

Conduct a thorough review of local operating procedures, as required, to include the following:

- Base Operations
  - Local Fire Situation
  - Mission planning facilities / capabilities
  - Type Retardant in use
  - Loading / Pumping Equipment Capability / Limitations
  - Aircraft Parking Locations / Procedures
  - Local Hazards: ramps, runway, approach, departure
  - Airspace coordination plan
    - Class B, C, D airspace
    - Noise Abatement Procedures
    - MTRs
    - Ingress / Egress altitudes to / from fires)
    - Standard VFR departure / arrival procedures
    - Prominent Local Landmarks
    - Flight Hazards / TFRs
    - Jettison Areas
  - Pilot Duty Day and Flight Time limitations
  - Engine-run up location / procedures
  - Weather, time of day limitations, or collocated military activity
  - Flight Plans
  - ARFF requirements (min 1500 gallons /3 pers for continuous C-130 ops)
  - Air-Tac / Lead plane procedures and other operations

**Tanker Base Pilot Orientation Briefing Guide (Cont)**

- Pit Operations (eg unidirectional pits, preferred pits, etc)
  - Fuel / Ground Power requirements
  - Aircraft Washing
  - Marshaling requirements (eg 10' obstruction clearance with wing walker)
- Dispatch Procedures
  - Standard Interagency Dispatch Form
  - GACC and Local Dispatch procedures
  - Flight Following (AFF, En route dispatch frequency, etc)
- C2 – ensure TB personnel pass On(Stopped) and Off(Rolling) times to AEG in Boise, ID
  - Phone - (208) 422-3422
  - Fax - (208) 422-3419
- RON requirements
  - Billeting
  - Transportation
  - Morning Brief Time

**Ramp Manager / Parking Tender**

- Engine Start coordination (Hand Signals preferred during heavy tanker operations)
- Identify any obstruction hazards and coordinate wing walkers as required (10' clearance)

**Load Attendant**

- Discharge Nozzle (Pintle) safety issues
- Retardant loading / metering procedures
- Emergency Shutoff procedures / signals

Figure A3.2. Standard Interagency Dispatch Form.

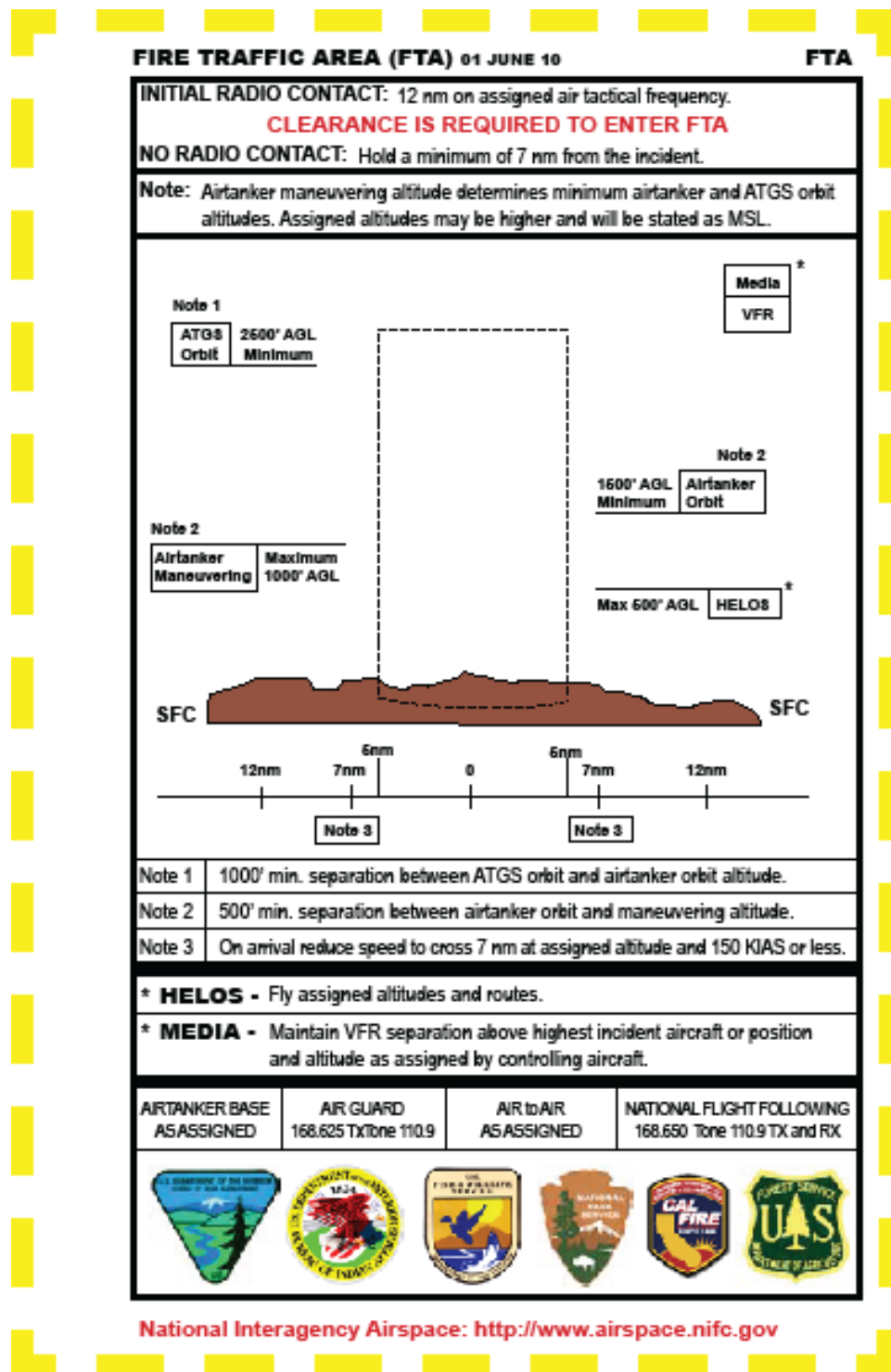
California Interagency Aircraft Dispatch-Tactical Air Operations CAL FIRE FC-106/U.S. Forest Service				
<b>INCIDENT NAME</b>			<b>DATE</b>	<b>TIME</b>
<b>ORDER #</b>			<b>P #</b>	
<b>DESCRIPTIVE LOCATION</b>				
<b>RESPONSE AREA</b>	<b>SECTION</b>	<b>TOWNSHIP</b>	<b>RANGE</b>	<b>MERIDIAN</b>
<b>LATITUDE (Degrees, Decimal Minutes)</b>			<b>LONGITUDE (Degrees, Decimal Minutes)</b>	
<b>BEARING</b>	<b>DISTANCE</b>		<b>FROM</b>	
<b>AIR CONTACT IDENTIFIER</b>			<b>AIR TACTICS FREQ. (FM) FIXED-WING</b>	
			Freq. Name	
<b>HELICOPTER 'VICTOR' FREQ. (AM)</b>			<b>AIR to GROUND FREQ. (FM)</b>	
			Freq. Name	
<b>GROUND CONTACT IDENTIFIER</b>			<b>COMMAND/ECC FREQ. (FM)</b>	
			ECC Name	
<b>GROUND TACTICS FREQ. (FM)</b>			<b>RELOAD BASE</b>	
Freq Name:				
<b>OTHER A/C</b>				
<b>HAZARDS</b>				
<b>REQUEST NUMBERS</b>		<b>A3</b>	<b>A</b>	
<b>A1</b>		<b>A4</b>	<b>A</b>	
<b>A2</b>		<b>A5</b>	<b>A</b>	



## Attachment 4

## FIRE TRAFFIC AREA

Figure A4.1. Fire Traffic Area (FOR REFERENCE ONLY).



**Figure A5.1. MAFFS Drop Log.**

[illegible]